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A VIEW OF THE BOSPORUS AT ITS NARROWEST PART

"The Bosporus never feels the influence of tides. From the vast bosom of the Mediterranean the evaporation is enormous. The contribution of its rivers, moreover, is small in comparison with that of the mighty streams which deluge the Black Sea. So in the Bosporus the flow southward is constant. The current sometimes attains a velocity of four and even five miles an hour. So violently does it rush by the promontories of Arnaoutkeui and Rumeli Hissar that the strongest boatmen are unable to row against it. This has given rise to a peculiar guild, or craft—the yedekdjis—whose whole business consists in towing vessels up the stream."—Edwin A. Grosvenor.

HOW TO OBTAIN THE BULLETIN

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The Zone of the Straits

BECAUSE the Turkish Nationalists, rebelling at the Treaty of Sevres which stripped the old Ottoman Empire to the bone, and the Greeks who profited heavily by the document, are fighting it out in the Near East, the Black Sea and its gates are again a field of world events.

The treaty which practically ended Turkish power in Europe made an entirely new entity known as the Zone of the Straits out of the narrow waters that separate Europe and Asia Minor—the Dardanelles, the Sea of Marmora and the Bosporus—and their shores. Over this was placed an international commission. The door which had so long been kept closed by the Turks when they desired, to the detriment of commerce, was to be flung wide open to permit the passage of ships of trade or war belonging to any nation. That this was accomplished in a measure was shown when Greek warships—barred from the Black Sea since the prosperous days of Byzantium—again sailed its waters.

On Road to the Golden Fleece

For thousands of years history and tradition have been busy about this chain of waters, from the mouth of the Dardanelles at the tip of the Gallipoli peninsula to the point nearly 200 miles to the northeastward where the narrower Bosporus sucks its mighty stream from the Black Sea. Tradition has it that Jason and his fellow searchers for the golden fleece passed through the straits; and later hardy Greek seafarers and colonists, and after them Romans and Genoese, built great cities on their shores and established over their waters the world-important trade routes of their days.

The Dardanelles, or the Hellespont as the Greeks called it, is the longer of the two great salt-water rivers that separate Europe from Asia Minor. It winds its way from the Aegean Sea with two sharp turns and numerous gentler curves, for 40 miles before it expands into the Sea of Marmora, the Grecian Propontis. The Strait varies in width from a little more than three-fourths of a mile to five miles. On the European side rises the steep ridge of Gallipoli where large number of Australians and New Zealanders perished while seeking to seize the Dardanelles. On the Asiatic side lies the plain in which stood old Troy.

"The Sea of Cities"

The Sea of Marmora, from which the Hellespont leads, is about 140 miles long and 40 miles wide at its greatest width. It is thus somewhat smaller than Lake Ontario, the smallest of our Great Lakes. Though relatively small, the Marmora once was the center of the world. Probably about no other body of water of such size have so many important cities stood. Of these, Constantinople alone is of importance today; but living and dead cities cover the shores of practically every harbor and headland of the little sea. The settlements that still exist are not even the heirs of the great cities of yesterday, but rather ill-kempt interlopers that, under Turkish domain, occupied their sites.

Photograph from Edwin A. Grosvenor. *© National Geographic Society.*

THE CITY OF CONSTANTINOPLE: LOOKING UP THE BOSPORUS AT ITS WIDEST POINT

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Russia's Bountiful Oil Fields

WHILE the United States and Mexico are forging ahead in the production of petroleum, feverishly developing their discovered fields and tapping new ones, the Russian fields, where some geologists believe are situated the world's most extensive oil resources, are to a considerable extent marking time because of disturbed conditions resulting from the World War. Although the Mexican oil fields are more spectacular, and though those of the United States are now yielding in the aggregate much more oil, the Russian fields, especially those near Baku on the shores of the Caspian Sea, have long been very near the front in world interest.

The oil territory about Baku is not like that in our own mid-continent fields where grain grew in a rich surface soil, and where there were no indications to tell the layman that far below the surface were pools of liquid gold. The oil-bearing strata reach the surface, or "out-crop," over a considerable area in the neighborhood of Baku; and the oil and gas, escaping at the surface, have made their presence known for ages.

Natural Gas Furnished "Holy Flame"

There are no indications that in remote times either the oil or gas was put to much practical use as modern people understand that term, but there is little doubt that priests of the fire worshiping cult which flourished in old Persia made a "good thing" out of the phenomena. Not far from Baku are the ruins of a temple of the cult which is believed to have been in existence for more than 2,500 years. Tower beacons and altars are provided with channels concealed in the masonry, which demonstrate that gas-fitting is not a craft of modern birth. These channels led from fissures in the earth which once furnished natural gas. To this temple came pilgrims from all parts of the East as late as the eighties of the last century. Beside the walls of the temple today stands a modern refinery, furnishing an emphatic contrast in the old and new uses of Nature's gift of oil and gas.

Appreciable production of petroleum began in Russia in 1863, four years after the first oil well was brought in on Oil Creek in Pennsylvania. The first year Russia turned out a little less than 41,000 barrels, while production in the United States was more than 2,500,000 barrels.

Russian Gushers are "Fountains"

Early commercial development of oil in Russia was strikingly different from the development in America. Dug wells were used. They were several feet square and of depths varying from a few feet to fifty feet or more. The oil seeped into the bottoms of the pits and was bailed out. These crude methods continued for eight years but under them a considerable production for those days was maintained. In 1870, the year before the bringing in of the first drilled well, more than 200,000 barrels were produced.

The bringing in of what Americans would speak of as the first gusher

Typical of the ancient Marmora cities was Cyzicus on the peninsula of that name on the southern shore of the sea. It was founded earlier than Rome or Byzantium and had a long life, possessed at various times by Athens, Sparta, Persia, Macedon, Pergamus and Rome. It was one of the finest of ancient cities in its prime and its gold coins were the standard of their day as the florins of Florence became the standard in Renaissance times. But when Byzantium, thanks largely to its incomparable location on the Bosporus, rose to power, the glories of Cyzicus faded. Today practically nothing is left of the once great city. Its buildings were not left to fall; they were torn down by Byzantines and after them by Turks and the stones used in the construction of the latest and still flourishing metropolis of the straits.

Front Gate to Black Sea

Though it is both narrower and shorter than the Dardanelles, the Bosporus, third link in this chain of historic waters, is perhaps most important; for it is the immediate gate to and from the great Black Sea which reaches toward the heart of Europe. To command this strait is to command one of the great trade routes of the world, a fact which has been written deeply into history from the days of the early Greeks to those of the waning Turks. The strait is about 20 miles long and varies in width from a third of a mile to two miles. Darius, Persian king, who invaded Europe, took his army over a bridge of boats which he had constructed across the Bosporus.

At its northern end the Bosporus expands suddenly into the Black Sea. This is no small sea comparable to one of our Great Lakes but a great body of water 750 miles long and from 200 to 400 miles wide. If located in the northeastern portion of the United States it would cover all of the New England states as well as New York and Pennsylvania.

Water Front of Many Nations

More nations were grouped around the Black Sea just after the World War than at any other time in history. On the European side of the mouth of the Bosporus was the tiny patch that remained of Turkey-in-Europe. Next came the new northern extension of Greece. Bulgaria and Rumania shared the western end of the sea, Rumania holding the lion's share. Across the north stretched the old Russian territory which may contribute one or many nations to the Black Sea family. To the east, their status equally questionable, the republics of Georgia and Armenia had a Black Sea shore line, at least on paper. The whole of the rocky southern shore was allotted by the peace conference to Turkey.

It is not only the countries which have a Black Sea frontage that are interested in that sea and its outlets to the south. The broad, navigable Danube, carrying the commerce of inland Austria, Czechoslovakia, Hungary and Jugo-Slavia to the Black Sea makes the final settlements in regard to this broad expanse of water a matter of vital interest to a large part of Europe.

Before the war plans were under way for connecting the Don to the Volga and so, by devious routes, to Lake Baikal in the heart of Siberia.

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When Our Weather Goes North for the Summer

THE ANNUAL PERIOD of drought "seldom equaled during the lifetime of the oldest observer" has "the world" in its grip according to statements that have appeared recently; and the usual theories have been advanced to account for this condition. As a matter of fact the altered weather situation is not so general as has been assumed and it is less a case of under-supply than under-distribution—to use marketing phrases.

Because we are most familiar with North America and Europe and receive the vast majority of our telegraphic dispatches from places on those two continents, we more or less naturally fall into the error of considering American and European conditions to be typical of world conditions. This is true of the recent dry weather as it was in greater measure of the abnormally warm and dry weather of the summer of 1921. These conditions probably were present over the middle latitudes of the entire northern hemisphere, but we certainly know them to have been prevalent only in a part of that region.

Reports Only From Northern Hemisphere

The United States Weather Bureau receives reports from localities spread over as great an area as that covered by any other meteorological agency, yet its operations are confined almost entirely to the northern hemisphere. And since the outbreak of the World War the Bureau's reports have not covered either European Russia or Siberia, which together make up nearly a half of the continental land rim about the North Pole. The situation in 1921 especially emphasized this matter of localization. We definitely knew that that summer was somewhat warmer than usual in Alaska; that the heat and dryness in the United States east of the Rockies and north of the Southern states was more pronounced than usual; and that the same factors raised the average temperature in Canada and ripened the crops earlier than usual. Because of heat, and possibly thinner ice, bergs were more numerous than usual in the North Atlantic; England suffered from a drought which made dangerous inroads into the London water supply; and the heat was oppressive in many parts of Europe, the mercury even rising much higher than usual in parts of Switzerland. Doubtless the famine in southeastern Russia was also due in part to an abnormal period of heat and drought.

The immediate cause of the warmer and dryer weather in the parts of the northern hemisphere with which we are most familiar was a temporary shifting of the belts of high and low barometeric pressure northward from their usual locations. It can hardly be said that the northern hemisphere as a whole experienced any different weather than usual. Rather, it might be said that we got the weather that belongs to the south of us, while our own normal weather went to minister to the Eskimos.

"Lows" Like Giant Stirring Spoons

These areas of high and low pressure play an all-important part in furnishing the world with its weather. Ordinarily their locations, if they are relatively

was not an unmixed blessing. This "fountain," or "spouter," as such wells are called by the English oil men of the Baku fields, was unexpected. Nothing was known of the handling of oil flows under high pressure at that time, so the well ran wild and could not be brought under control. Most of the oil was a total loss.

When later "fountains" were brought in under control nothing like the present demand for oil existed in Europe, carrying facilities were poor, and the presence of great quantities of the liquid above ground demoralized conditions. The Russian government experimented for a number of years with monopoly regulations and then heavy taxes. When taxes were reduced in 1877 the Baku oil industry grew very rapidly.

Tatars Fight Pipe-Line

Before the first drilled well was brought in all oil was transported to Baku from the oil fields, a distance of eight or ten miles, in barrels on awkward two-wheeled Tatar carts. An endless stream of them traversed the unspeakably bad road from morning until night. After the advent of gushers a pipe-line was projected. The Tatar carters staged a riot when the plan became known. The pipe-line was constructed, however, and the carting industry died.

From their commercial start in 1869 until the outbreak of the World War the Russian oil fields were second in world production except for a few years when they passed the United States. When Russian production reached ten million barrels in 1884 the United States was producing 24 million. In 1898 the output from Russian fields passed that from the United States, being 61,609,000 to the latter's 55,364,000. In 1901 when Russian production reached its highest figure—85,000,000 barrels—it was well ahead of that year's production in the United States: 69,000,000 barrels. But the very next year the United States jumped to 88,000,000 while Russia's production was only 80,000,000. The lead of the United States has increased steadily since that date.

In its banner year, 1901, Russia produced a little over half of the output of petroleum in the entire world for that year. The production from the United States was not much under a half, and over 90 per cent of the world's oil came from the two countries.

Year's Production Equals Month's Output in United States

In 1913, the last complete year preceding the war, Mexico had joined the United States and Russia in contributing the lion's share of the world's oil. The three countries produced practically 90 per cent: the United States 65, Russia nearly 17, and Mexico nearly 7. These three countries now produce more than 90 per cent of the oil output of the world, but since 1913 Russia's output has fallen steadily, that of the United States and Mexico has steadily advanced.

The 1920 Russian production is believed to have sunk to about 25,000,000 barrels.

The oldest and best known oil fields near Baku are on a bare, desert-like plateau a hundred feet or more above the Caspian Sea. The oil sands are found at various depths. The pools are believed to be in lens-shaped pockets largely independent of each other. Gas pressure in many cases is very high. As a result gushers of great initial production are struck but unlike the Mexican wells, the production is not long-lived. It is believed however that the oil pockets are numerous and that many are untapped.

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The Danube: Highway, Barrier, and Battleground

COMPLETION of the internationalization of the Danube by the formal action of the interested Allied Powers brought that famous river once more into the public eye.

From the Black Forest to the Black Sea, over a course of 1800 miles, the Danube has long been a chain upon which romance and history have vied with each other to hang interesting traditions and occurrences. Geography, too, has done its share, and although the Volga exceeds its rival in length, and although the Rhine has had better press agents, the Danube is large enough and beautiful enough to rank in interest with the great rivers of the world.

Less a Highway and More a Barrier

There was a time when the Danube was symbolized by an old fashioned waltz. But since the World War began, nothing but a hesitation typifies the place the river has held in the economic life of the countries through which it runs. It has been less the highway and more the barrier than in pre-war days.

Near its source at Donaueschingen, the river passes between the castle which gave its name to the late ruling family in Germany and a war monument to the Hohenzollern men who fell in the Franco-Prussian War. Farther down it passes through the once-proud capital of Austria-Hungary, where the fine government buildings stand to the despairing inhabitants as a mocking reminder of better days, and beside the Prater, once a deer park and later a pleasure garden noted for its Viennese gaiety.

Still farther along its course just after entering Czechoslovakia, at its junction with the March, there is a towering cliff spired with a monument erected to celebrate one thousand years of Hungarian nationality. This is Czechoslovakian territory now, and there a summer or so ago the Stars and Stripes were draped on the occasion of the visit of a large group of Czech-Americans to the newly freed land of their fathers.

Bratislava, now Czechoslovakia's river port, was once the city in whose dignified cathedral the Hungarian kings were crowned. The boat station there revealed, a short time ago, the changes which history has wrought. Over the center of the landing the present name was given, but to the left one could see most of the letters of the German name "Pressburg" and to the right there was the Hungarian name "Poszony."

Budapest Not War-Torn

Vienna, brooding in its lovely parks, which lack the care that was once lavished on them, and contemplating with cynicism the motto "Si Vis Pacem, Para Bellum," whose golden letters decorate the walls of the Ministry of War, is a sad sight. But Budapest seems to have been less troubled by the passage of war.

Food is the main reason. Hungary, reduced as it is, still contains some of the best land in Europe. Vienna, its industry stopped, can do little to earn the food it needs.

To the casual observer, Budapest is the same proud city as of old. The fine Parliament Building and the imposing Palace on the heights across the river,

stationary, and their paths, if they move, are pretty well known. The "highs," roughly, mean stagnation; they mark the "horse latitudes" of the mariners—regions of calms and light shifting, undependable winds. The "lows," on the other hand, may be considered the great ladles with which Nature stirs her weather brew.

Usually in the summer a succession of "lows" forms over interior Alaska, drifts down east of the Rockies, traverses the northern portion of the United States and passes from the continent down the St. Lawrence valley. In their paths these "lows" usually leave changes in wind direction, lower temperature, and perhaps rain. They are disturbers of the status quo. The "highs," more nearly stationary, usually stand like sentinels off the middle Pacific and Atlantic shores, and herd the drifting "lows" to the northward at arm's length.

Our Rains Fell in Arctic

As an example of what sometimes happens in the summer the situation in 1921 may again be cited. The North Atlantic "high" spread out in all directions to a much greater extent than usual and covered a greatly increased area, even encroaching on the North American and European continents. The result was that the path of the "lows" was pushed farther north. In America the disturbances that are counted upon to stir up the weather periodically in the northern states did not drift as far south as the Canadian border, and when they advanced so far they seemed to bounce off as though a weather wall had been set up along the boundary. On the other side of the Atlantic the disturbances which usually crossed England and southern and central Europe were shifted off to the north of Norway. Doubtless the rains which should have watered our northern states and the "Tight Little Isle" fell in the muskegs about Hudson Bay, on Greenland's icy mountains, and on the frozen wastes north of Europe and Siberia where the midnight sun was shining.

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A COMET WHICH LOST ITS TAIL AS IT FLEW AWAY—A SORT OF TADPOLE OF THE HEAVENS
(See Bulletin No. 5).

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Our Mysterious Visitors—Comets

A MODEST local brief in the journal of this universe, (which a physicist believes to have some limit, even though one astronomer now conceives it to be a thousand times larger than we thought it) might read like this:

"On June 27, 1921, the tiny planet, Earth, saw sparks (meteoric showers) from the swish of the 2,000,000-mile tail of the comet, Pons-Winnecke, which missed hitting Earth by only 12 million miles."

Though we are not certain of the exact nature of these "hairy stars," astronomers believe comets are made up of small particles, very far from each other, surrounded by masses of gas.

The main body of a comet varies from a few hundred to a few thousand miles in diameter, and its tail, which makes it as spectacular among heavenly bodies as the tail of the peacock makes him in the bird world, measures from a few million to more than a hundred million miles in length.

Tails Turn From Sun

The tails of comets have some peculiar characteristics. They always turn away from the sun, and they increase and decrease with astonishing rapidity, the sun evidently causing them to lengthen enormously. Though its volume is very great, the actual mass of a comet is very small. Scientists tell us that the average density of a comet is but a fraction of that of the air near the earth's surface, and that the density of the extremity of the tail is, of course, very much less.

This is evident from the fact that these bodies, which are so much larger in volume than the planets, are deflected from their orbits by the planets, which are not even disturbed enough by their appearance for any observations to be taken of it. Even when a comet passed through Jupiter's satellite system in 1886 not a moon veered from its course, but the comet totally changed its orbit as a result of the magnetic force exerted. That the substance of comets and their tails is much rarefied is further apparent because even the faintest of the visible stars can be seen through them.

Work associated with the behavior and the nature of comets and their orbits is yet in its infancy, and the knowledge that the spectroscope reveals regarding their composition is confusing. It seems to say that they are made of hydrocarbon vapor which shines by its own light, but part of their light must be reflected sunlight as the brilliancy of a comet increases as it approaches the sun and diminishes as it passes away.

Jupiter a Siren for Comets

The idea that comets are wanderers in space has long ago been given up. Now we know that they belong to our solar system, but their orbits are such large parabolas or ellipses that they sometimes require hundreds of thousands of years to complete a revolution. Occasionally the fascinating Jupiter will lure one of the "shooting stars" from its straight and narrow path. Like the foolish

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where Admiral Horthy now rules, seem as attractive as before the war. The upper river is still crowded with bathers and with canoes and rowboats. Along Franz Josef Quai, the promenade adds a lively touch of color to the drab scenes to which the beautiful blue Danube has become accustomed.

Celtic Fortress Still Stands

From Zemun, once the last Hungarian port on the Danube, a short trip between low banks brings one to Belgrade, the capital of the new Kingdom of the Serbs, Croats and Slovenes, where the steamer rounds the base of the ancient fortress which dates back to the time of the Celts, the Romans and the Franks, and comes to its dock a little way up the Save, which here enters the Danube from the south.

About four hours' sail below Belgrade the wide plains give way to hilly country where the Transylvanian Alps curve down toward the jumble of mountains which extends to Montenegro and Greece. It is in this region that the main obstructions to the river occur. But the most famous obstructions and the finest scenery come at the Kazan Defile and the "Iron Gates."

One of World's Longest Bridges

At Rustchuk, the railway traveler from Rumania ferries across a broad and sluggish stream to continue his journey to Sofia and Constantinople; and here the banks of the Danube are lined with huge barges. Below Silistria, the river curves to the north and passes through Rumanian territory throughout the rest of its length. At Cerna Voda, it is crossed by one of the longest railway bridges in the world.

Braila, 125 miles from the three main mouths of the Danube, is a port for the grain and produce of a rich agricultural region. In pre-war days its wharves teemed with life and its huge grain elevators bulged with the rich products of Wallachia and Dobrudja, which has seen great development since the Russians gave it to Rumania instead of the more valuable and fertile tracts of Bessarabia.

Bulletin No. 4, October 30, 1922.

Photo by Ernest L. Harris.

SCENE IN A GREEK VILLAGE ON THE ASIATIC SHORE OF THE DARDANELLES STRAIT

moth it will revolve around the greater light and apparently for a brief while become a part of its system, only to pursue its own way after discovering the vanity of its affection. When the comet chances to cross the orbit of the earth we experience a meteoric shower.

Sometimes Jupiter reduces comets entirely to subjection and they stay on with that planet as part of its numerous and expansive family. They then circulate in elliptical orbits around their conqueror and gradually dissipate their substance along their tails until they become entirely invisible.

How Tail Stands Wear and Tear

The tail of a comet in all its gorgeousness is not a mere appendage. If it were, it would not long stand the wear and tear that hurtling through space would give such a thin mass of matter, nor could it be flipped from one side to the other as is the case when the body passes in the neighborhood of the sun. It must be made largely of dissipating vapor, never the same from second to second, volatilizing or evaporating from the heat of the sun, to shift like the smoke in a chimney with the outside influences which control it.

All of us remember Halley's comet because it appeared in all its noted brilliancy in 1910 on its 76-year tour of the skies in harmony with the astronomers' predictions concerning it. One of the most famous comets in history is that of 1680, by which Newton proved that comets move under the influence of the gravitation of the sun; it is believed to be the one which appeared shortly after Julius Caesar was murdered, as well as the comet which caused excitement in 531 and in 1106. If Halley's suspicions be confirmed that this is the same comet with a 575-year period, our posterity will hail it in 2255.

Bulletin No. 5, October 30, 1922.

Note to Teachers

Since both school and public libraries generally have bound volumes of The National Geographic Magazine it has been suggested that references to articles and pictures in The Geographic concerning topics treated in the bulletins would be helpful. Therefore references which may be of use for further study of the subjects, or for source material in project and problem assignments, are contained in the following partial bibliography extracted from "The Cumulative Index to the National Geographic Magazine." A limited supply of some copies may be ordered from The Society's offices at the prices named. Those numbers marked with an asterisk (*) are out of print.

Astronomy: Exploring the Glories of the Firmament. By William Joseph Showalter. Vol. XXXVI, pp. 153-181, 17 ills., 3 charts, 1 diagram, Aug., 1919. 25c.

Austria-Hungary: Land of Contrast, The. By D. W. and A. S. Iddings. Vol. XXIII, pp. 1188-1218, 34 ills., Dec., 1912. 75c.

Constantinople and Sancta Sophia. By Edwin A. Grosvenor. Vol. XXVII, pp 459-482, 21 ills., May, 1915. 25c.

Constantinople Today. By Solita Solano. Vol. XLI, pp. 647-680, 41 ills., June, 1922. 50c.

Dardanelles: Gates to the Black Sea: The Dardanelles, the Bosporus, and the Sea of Marmora. By Harry Griswold Dwight. Vol. XXVII, pp. 433-459, 27 ills., May, 1915. 25c.

Hungary: A Land of Shepherd Kings. By C. Townley-Fullam. Vol. XXVI, pp. 311-393, 92 ills., 1 page map, Oct., 1914. 25c.

Our Heralds of Storm and Flood. By Gilbert H. Grosvenor. Vol. XVIII, pp. 586-601, 15 ills., 1 chart, Sept. 1907. (*)

Oil: Billions of Barrels of Oil Locked up in Rocks. By Guy Elliott Mitchell. Vol. XXXIII, pp. 195-205, 10 ills., Feb. 1918. (*)

Where the World Gets Its Oil: But Where Will Our Children Get It When American Wells Cease to Flow? By George Otis Smith. Vol. XXXVII, pp. 181-202, 21 ills., 3 page and half-page maps, Feb. 1920. 35c.

Russia: Young Russia; The Land of Unlimited Possibilities. By Gilbert H. Grosvenor. Vol. XXVI, pp. 421-520, 85 ills., in black and white, 17 ills. in color, Nov. 1914. 50c.

Russia's Orphan Races: Picturesque People Who Cluster on the Southeastern Borderland of the Vast Slav Dominions. By Maynard Owen Williams. Vol. XXXIV, pp. 245-279, 26 ills., 1 page map, Oct. 1918. (*)

Weather: Forecasting the Weather. By Alfred J. Henry. Vol. XV, pp. 285-292, 6 ills., 1 chart, July, 1904. (*)